AMERICAN DYESTUFF REPORTER

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Color Integrity in Private Branding

By WALDON FAWCETT

It has needed only the recent research by the Federal Trade Commission to prove how rapid and how extensive has been the recent increase in the distribution of commodities under private brands. Perhaps it would be fortunate were there at hand in the same quarter revelations of the trend of developments calculated to similarly emphasize the fresh responsibilities laid upon the essential producing industries by the latter-day spurt in "marketing by proxy."

TO DEMONSTRATE that the dyestuffs industry has more than has been suspected at stake in the drift to "own label" merchandising strategy, it may be well to cite the Federal Trade Commission in proof that private branding is by no means confined to articles of food. The Trade Commission had no search warrant for private labeling as such. Its exploration of the ghost—identification of merchandise was quite incidental to response to a Resolution of the U. S. Senate calling for information regarding the practices and profits of chain stores. Yet the Commission found that, even if vision be restricted to the chains, is there discernible a noteworthy increase in the dollar volume of sales of wearing apparel under private brand?

Given this proof that the volume of private brand sales is increasing and that private brands are steadily gaining in proportion to total turnover at the retail level, there is a distinct summons to the color industries to inquire as to the effect upon consumer-confidence and established good will. For, even though private branding were always conducted conscientiously and in accordance with the highest ethical ideals, the fact would remain that the essence of the system involves an overturn of the traditions of commodity responsibility. In operations under private label, as usually conducted, the name of the actual manufacturer or producer does not appear on nor in connection with the goods. No more is there disclosure of the contribution of any processor or intermediary in production. The sole identification, albeit at second hand, is that of the distributor—either jobber or retailer, as the case may be. In only a few instances is there, in the labeling, hint of the true state of affairs via notation that the wares have been made "to the order of" the private brander. In most instances, the unsophisticated might be left to believe that the private brand was the factory-mark of the primary producer.

Two circumstances are summoned by defendants to refute any suspicion of jeopardies in private branding. First, it is argued, that the owner of a private brand (assuming that it is destined for permanent use) has, in degree, the same incentive as the manufacturer of a standard brand to jealously cherish the reputation of the brand name upon which he must depend for repeat orders. Secondly, it is pointed out—and proven by the fresh Federal statistics—that private brands usually sell for prices equal to the standard brands. Only a small proportion of the total number of private brands in any line are designed as "fighting" brands. On the contrary, recourse to private brands is, in many instances a device to establish immunity from price competition.

For all the seeming sufficiency of the alibi, there are member of the dyestuffs industries who are vaguely disquieted with respect to the maintenance of color integrity in lines where private branding is rife. The first count of the tentative indictment discerns peril in the diffusion of responsibility for quality in the dyed products. If the ultimate consumer runs a risk when there is no interest to "stand behind" an article, save the distributor who passes it along, how much more precarious is the position of the "own label" owner who has not the means of insuring expected standards of material and workmanship in the goods branded with his private trade mark.

That this hazard of lack-of-control is anything but visionary will be realized when it is stated that only a relatively small proportion of private-brand goods are manufactured to rigid specifications and checked by confirmatory inspections in the course of manufacture. Manu-

(Continued on page 654)

Color as a Transformer of Energy

By **RENE TOUSSAINT**

This paper, because of its interest, has been translated from *Tiba* 10, 589, 591, July, 1932, by A. Papineau-Couture.

THE color of a lighted object can be characterized by a greater or less capacity for absorption of radiations of different wave-lengths which it receives.

If wave-lengths be plotted as abscissae against the intensity of emission (of the source of light) and of transmission (of the color to be analyzed) as ordinates, and the intensity of a source having a constant intensity along the whole length of the spectrum be represented in a horizontal straight line having an ordinate of 100, any color can be represented by a curve lying between the two horizontal straight lines 0 (black) and 100 (white).[1]

We had thought, up till now, that such curves could have any shape whatever. But on examining the very large number of curves which we have obtained by means of the photo-electric cell in the course of the last few years, we have found that all dyestuffs, without exception, can be graphically represented by a vertical absorption wedge, or V, the base of which lies near the 100% intensity line (almost 0 absorption) while the height of the apex depends on the concentration and characterizes the optical effect. When the apex is in the violet portion of the solar spectrum (maximum absorption in the violet) the dyestuff is said to be yellow; in the blue portion, it is orange, and so on to the red end of the spectrum for green colors. When the whole of the absorption wedge is beyond the visible spectrum the color is said to be white. The greater the angle of the wedge the more impure is the color and the closer does it approach to grey, theoretically neutral grey being obtained with an angle of 180°.

An absorption wedge can thus characterize a color in a very simple manner by (a) the wave-length of maximum absorption (chief color effect), (b) the height of the ordinate at this wave-length (brightness), and (c) the inclinations of the sides of the wedges and irregularities therein (secondary color effects).

This method of representation clearly shows the heresy of the chromatic circle, complementaries and dominants. There is no circle since the spectra of emission from the source and of transmission by the color are unlimited while the limits of the visible spectrum itself vary with the power of the source of light used. Moreover, there are no dominants, or rather there is always an infinite number of dominants since on all the curves there are an infinite number of points having ordinates near 100. As to complementaries, they cannot exist since there are no dominants and also since it has never been possible to obtain a neutral grey (*i.e.*, grey that remains constant irrespective of the color of the source of light) by superposition of two colors.

The wedge also shows that in dyeing, where such a thing as a white dyestuff is unknown, the use of an additional dyestuff can never increase transmission, but can increase only absorption and necessarily produces a reduction in brightness.

Absorption wedges are generally not symmetrical, the right hand side (towards the longer wave-lengths) being nearly always steeper than the left hand side, because, as is the case with practically all substances, the permeability of dyestuffs decreases as the wave-length of the incident light increases. The right-hand side can therefore be considered as fixed, while the left-hand side can easily be modified and given such inclination as may be desired.

This furnishes an explanation of some peculiar properties of dyestuffs.

As the right-hand side of the curve always is very steep and practically fixed, all dyestuffs for which the left-hand side is wholly in the invisible ultra-violet portion of the spectrum must appear pure and retain the same appearance; this actually is the case for all the yellows, which are always considered as pure and with which it is impossible to obtain dark shades, no matter what their concentration.

With orange dyes, for which the left-hand side of the curve begins to appear in the violet of the visible spectrum, the same phenomenon is still noticeable, though not as clearly; all oranges appear pure and none of them can give dark shades.

With reds, the left side of the wedge extends through both the blue and violet portions of the visible spectrums; it is therefore possible to "see" impure and fairly deep reds.

With violets, blues and reds, the left side of the wedge is entirely in the visible spectrum; all the modifications

[1]For further explanations see Bulletin de la *Societe d'Encouragement pour l'Industrie Nationale*, Vol. 126, 421-30, June, 1927; *Chem. Abs.*, 21, 3492 (1927).

(Continued on page 653)

Proceedings of the American Association of Textile Chemists and Colorists

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CALENDAR OF COMING EVENTS

Annual Meeting, Greensboro, N. C., Dec. 2 and 3.

* * *

Meeting, New York Section, Nov. 18.

* * *

Meeting, Philadelphia Section, November 18.

FALL MEETING, SOUTHEASTERN SECTION

THE Fall Meeting of the Southeastern Section of the American Association of Textile Chemists and Colorists was held October 15th at the Ansley Hotel, at Atlanta, and was attended by about seventy textile chemists, dyers, and mill officials of Georgia, Alabama, Tennessee and the Carolinas.

Charles B. Ordway, Secretary, acted as Chairman in absence of E. A. Feimster.

Robert W. Phillip, editor of "Cotton," Atlanta, was introduced and gave a strong and hearty address of welcome. He stressed the advantages that this section enjoyed through the cooperation of the Auburn and Georgia Tech Schools which are close by.

The entertainment committee put on an excellent set of song and dance numbers.

C. M. Stodghill of the Stodghill Chemical Company gave a highly instructive paper on "Cotton Warp Sizing and Its Composition."

The chairman asked Mr. Paul Seydell to lead the discussion and this covered the chemical and structural make-up of the cotton fiber and hygroscopic requirements for sized cotton warp yarns.

Robert Cowan, Quaker City Chemical Company, Knoxville, talked on "Dyeing and Finishing Troubles Caused by Mildew or Mould Fungi."

Professor A. R. Macormac of Clemson College stated that tapioca starch was freer from mildew formation than other types.

Carl Epps of Tubize-Chatillon Corporation talked on "Rayon Knitting, Dyeing, and Finishing."

The Nominating Committee recommended the re-election of the present officials for 1932-33. They are as follows:

E. A. Feimster—Eagle & Phenix Mills, Columbus, Georgia, as Chairman.

H. H. Field—Eagle & Phenix Mills, Columbus, Georgia, as Treasurer.

Charles B. Ordway—Alabama Polytechnic Institute, Auburn, Alabama, as Secretary.

(Continued on page (294) 644)

Proceedings of the American Association of Textile Chemists and Colorists

Properties of the Acele Yarns in Regard to Dyeing and Finishing*

By **C. F. CHANDLER**

Acele Department, E. I. duPont de Nemours & Co.

BEFORE telling you about Acele, let me explain that I am not a dyer. My job is to understand our product, particularly to give those using it practical information on how it can best be handled.

What I have to say tonight will therefore not be primarily about dyeing, but rather on how Acele yarn behaves in the hands of the finishers.

Acele as most of you know, is du Pont's cellulose acetate yarn. It has been made at Waynesboro, Virginia since the fall of 1929. Being a cellulose acetate and not a regenerated cellulose thread, many of the usual distinctions reserved for this type of fibre must be remembered.

Generally these are:

Low moisture content.
Lack of affinity for water.
High elongation, especially when wet.
High wet tenacity.
Somewhat readily affected by alkalies.
Solubility in acetone and other organic solvents.
Special dyeing properties.

Each of these points has a specific bearing on how Acele should be treated in the dye house. Taking the first operations, namely, desizing and preparation for the dye bath, particular attention must be given to wetting out the goods. There are three factors effecting this:

The type of sizing present.
The finish or oil on the yarn.
The nature of the yarn.

Most of the sizes used on Acele are made from gelatin, glue, gum or casein bases along with various softening agents such as glycerin, sulphonated oils and glycol. As Acele does not take up the size and most of it is on the surface, it is fairly easily removed, if not put on too heavily. It should be noted that starch is not ordinarily present, and therefore pretreatments with malt enzymes do little if any good. Also most of the protein sizes tend to harden if the temperature is raised to about 175° F. too quickly. In most cases soap and water with a little ammonia will do the work, starting warm and gradually raising the temperature.

Desizing is a subject in itself and unfortunately I cannot spend much time on it.

The second factor; the finish or oil put on the yarn in our operations plays just as important a part as the size. This finish is absolutely necessary in the textile operations, serving to lay static and bind the filaments together. Very careful selection of the materials entering into it must be had, as otherwise the yarn will absorb minute amounts of oil which are practically impossible to remove. If this occurs, the thread becomes very difficult to wet out, affecting sizing, desizing, depth and uniformity of dyeing. We use a water soluble finish, which is not held by the yarn and which makes far easier sizing, desizing and dyeing. Also on our bright yarns we include a blue tint in the finish, a very pale blue for the weaving trade, and a much darker blue for the hosiery trade. Fugitive tints on acetate yarns have peculiarities as many of you have perhaps found out. The blues, violets and greens are as a rule very fugitive, while reds, yellows and oranges are less so. A trace of ammonia in the desizing bath will materially assist in removing most of the colors.

If tinted goods are kept damp for several hours, the yarn finally becomes so well wetted that the color is apt to be absorbed as a dyestuff and become fast. Sometimes this happens from water being splashed on the raw goods, causing tint spots in the finished fabric. These spots, even if caught before dyeing are very difficult to remove, as stripping or bleaching have little effect.

After removing all of the size and finish it is commonly thought that the goods are ready for dyeing. This is only so when the process has been run so as to insure proper wetting out of the yarn. Time and temperature are the important factors. Real wetting of Acele takes place quite rapidly above 150°F., at lower temperatures it is slow. Consequently the preparation process should be completed fairly hot. Wetting agents are of assistance, but according to the type of goods being handled, can often be replaced by an extra dipper of soap.

As Acele does not deluster readily by boiling, temperature restrictions can be removed. It is common practice to go as high as 190° F. and if necessary, even higher. Extremely prolonged working at temperatures above 190° F. while not appreciably affecting luster, will produce a slight milkiness, and slightly saponify or hydrolyze the fiber. This not only lowers the dye affinity but increases the likelihood of streaks. This resistance to high temperatures is a very valuable property of Acele. Silk

*Presented at meeting of New York Section, September 23.

combinations can be easily handled, and of course, the advantages in boiling off and dyeing are apparent.

In speaking of dyeing, I am somewhat at a loss on how to approach the subject. I was asked particularly to say something about dyeing our dull Acele. So far the remarks have been applicable to both our bright and our dull yarns, and in general this applies to the dyeing operations. Both types of yarn behave the same except for the presence of delustrant in the dull yarn. As far as I know both yarns follow the same laws of color absorption. However, because of the delustrant, somewhat different dyeing results are obtained. The depth of dyeing of an acetate yarn is largely controlled by the combined acetic acid content, and natural luster by the shape of the cross-section. Incidentally, it is these two factors that largely control uniformity. In dyeing either regular or dull Acele very little is ever heard about light shades. It is always the dark shades. Dyestuff up to 2 or 2.5% is quite readily taken up. As the shade deepens, color absorption becomes slower and more difficult. Eventually a point is reached where adding more color does little good. This is particularly true where color is added too rapidly.

In comparing the dyeing of dull Acele with bright Acele, it will be observed that color goes on at the same rate, but that on account of the delustrant, more must be used to obtain comparable shades. Of course, this increases the difficulty in obtaining dark shades, as even a slight increase in shade will need appreciably more color in the dyebath.

When dull Acele was first tried in dark shades considerable criticism was received to the effect that the dullness was not maintained. There is a very simple explanation of this. The cross-sectional shape of each yarn is the same. Under a microscope the bright yarn is almost transparent, as is a film cast from the spinning solution In the dull yarn this transparency is lost. Strictly speaking this yarn is not dull, it is opaque. When dyed in dark shades the delustrant must be covered or the shade is not reached. Once it is covered its effect is largely lost and the thread has lost some of its dullness.

Fortunately, luster of a fabric is not controlled entirely by the yarns used. Construction is just about as important and the skillful use of dull Acele in the rough weaves for fall has produced the desired dullness with the angel skin hand so difficult to get in other types of yarn.

I am not sure how well this light is adapted for showing differences in luster, but here are several fabrics, rough and smooth weaves, bright and dull yarns that may be of interest.

Proper finishing also has much to do with preserving the natural dullness or luster of fabrics. Normally Acele fabrics do not shrink much, but rather they stretch. Consequently they should be finished as near the woven width and yardage as possible. Stretching, and finishing under the undue tension not only gives a papery hand, but increases the luster. Drying too quickly at too high temperatures will also bring out an undesirable finish. Under normal conditions Acele contains about 6% of moisture, about half as much as silk or other types of rayon. This means it dries much more readily. Harshness is often the result of too quick drying. Best results seem to be to leave at least the normal amount of moisture present in the finished cloth.

So far, I have given a brief outline of preparation, dyeing and finishing. One of the most interesting parts of my work is trouble. Fortunately, it doesn't take up the most of my time. Perhaps a few of the problems encountered may be interesting to you.

All of you have doubtless seen filling bars, and probably have been blamed for them. I know I have, and most of the time find the fault, not in the yarn, or in the dyeing, but in the gray mill. Bars are quite common in twist combinations, especially with cotton and spun rayon. Twist variation is the answer. Bars in taffetas and plain fabrics come from a number of sources. A common one is stretched filling yarn, stretched either during copping or in weaving. If the yarn has been oiled, as is sometimes the case, and the oil is not all removed, bars will occur. This may or may not be a finishing fault. Yarn faults that can give bars are: a variation in cross-section, denier and twist. As a rule, bars from yarn faults are few and far between. They depend entirely on the skill of our operating department in making uniform yarn.

Warp streaks, of course, must be mentioned. The same remarks about yarn as mentioned above cover these. By far, the most serious warp streaks come from incomplete removal of size and finish. Here again the fault may or may not be in finishing. It all depends on the kind and amount of size applied and how vigorous a treatment must be used to remove it. There are many other causes of streaks, such as over-stretching in slashing and bad tensions in the loom beam. The dyer cannot do much with them, other than to prove that the fault is not his and place the blame somewhere else.

A fault that is quite common, however, and is solely the dyer's responsibility is bad odor in the goods. It is caused in two places. Sometimes dyeing assistants with a cresol or phenol base are used. Acele takes up such agents much the same as a dye, and from experience it would seem that the odor is just as fast as most of the colors. Finishing oils can be a source of trouble too. My personal opinion is that they should be used with care and caution, as the yarn will not take up very much and the fabric is apt, not only to smell badly, but to have a disagreeable hand. I know of one claim paid because so much oil was used that some of the color dissolved and

after storage came out in spots on the goods. If normal or slightly higher moisture contents are left in the fabric, less finishing oil is needed.

There is much more that could be said but possibly if I have not already run over my time, a few minutes of open discussion might bring out some specific points I have not touched on.

DISCUSSION

Chairman Herrmann: I think we are all agreed that Mr. Chandler has handled his subject very well. Now, if any of you gentlemen would like to have any more harsh irritants removed, let's have the questions. I am sure that the talk has touched on a great variety of topics many of which have come to our attention from week to week, and especially during the recent great increase in the processing of this type of yarn.

Mr. Chandler as well as the Chair welcomes your questions.

Mr. Schottig: You spoke of finishing oils. Do finishing oils act the same on Acele as they do on ordinary Rayons?

Mr. Chandler: No, they do not.

Mr. Schottig: Are they not absorbed by the Acele?

Mr. Chandler: No, only in minute amounts. I think Dr. Powers, of Röhm & Haas at one time did some very interesting work on the absorption of oils by acetate yarn. He found that they would only take up a relatively minute amount.

Remember, an acetate yarn is quite inert toward a good many of the oils, as well as water. They really are not taken up the same at all or to the same degree as a Viscose or a Nitro or a Cuprammonium yarn will take them up.

Mr. Schottig: Well, could your oils be removed from your Acele as readily as they could from the others?

Mr. Chandler: A great deal more readily. That is, if you put 4 per cent of oil on the thread, you will find that that oil is very readily removed. This minute quantity that I am talking about, which is absorbed, while it is of practical importance, many times—most of the time—is more of theoretical interest than practical.

Mr. Schottig: Are you referring to soluble vegetable oils, rather than mineral oils?

Mr. Chandler: Both types. Of course, the sulphonated oils are probably more readily taken up in appreciable amounts than the mineral or the straight vegetable oils.

I think that the oil problem is a very interesting one and one that I don't believe has been investigated as thoroughly as it ought to be. At least, if it has been, the results haven't been made public.

Mr. Ephraim Freedman: Mr. Chandler, what is the effect, if any, of carbon tetrachloride on acetate yarn?

Mr. Chandler: Carbon tetrachloride is not a solvent, especially at ordinary temperatures. However, it is rather a severe swelling agent. If you are speaking in connection with cleaning and spotting, most of the time in the hands of an experienced operator carbon tetrachloride can be used. However, you must watch it quite carefully as when it is rubbed too hard on the fabric it is liable to chafe the face and leave a bad spot present.

I never, if I can help it, recommend the use of carbon tetrachloride for that purpose.

Mr. Freedman: I believe you mentioned the use of water and soluble size in the yarn, to begin with.

Mr. Chandler: Yes.

Mr. Freedman: Then the use after that of gums, glues, gelatines, sulphonated oils, and glycerins. As I understood it, the yarn itself is first treated with an oil.

Mr. Chandler: I went backwards on that in the order of the removal of it. Let's start with the yarn in our plant.

We apply a very small amount of a water soluble finish in our plant. That yarn with the finish goes to our customers and where it is warp sized by the customer with these gum and casein compositions and then put in the loom it goes to the finished who has the job of washing out all this mixture that has been put on there.

Dr. Jos. F. X. Harold: Is the duPont Company in position, in order to avoid a good deal of trouble, or will it be in a position to issue dyed yarns of standard colors from time to time?

Mr. Chandler: When you speak of standards Doctor, what do you mean,—standard color cards?

Dr. Harold: Yes, something of that kind.

Mr. Chandler: I very seriously doubt that.

The manufacture and sale of dyed yarns by a Rayon manufacturer is quite a problem. It is very difficult to produce a shade of blue, or any other color, that two customers will agree is exactly right, but practically, as far as we are concerned, the capacity of our plant would be limited and we would not be in a position to supply dyed yarn for a long time to come.

Dr. Harold: I should like to ask, from the chemical standpoint, if you think there would be any hydration difference between a skein of yarn which you dried rapidly and one which you had dried slowly. In other words, would there be any hydrolysis differential?

Mr. Chandler: That is a rather difficult question to answer. However. I believe that the rate of drying, especially if you go below the normal regain point of the yarn, five to six per cent, will be affected. That is, when you go below that point you are undoubtedly driving off moisture that is held by the yarn. Once driven off, it would not come back as readily as before.

Does that answer your question?

Dr. Harold: I mean, to follow that up, supposing that a skein of yarn is dried under conditions which promote

extremely rapid drying in some portions and slow drying in others? Would there be such a change in hydration of the yarn, I mean the constitutional hydration, perhaps attended by some hydrolysis, in the drying of that skein as would lead to uneven dyeing by reason of chemical differences set up by the differential rates?

Mr. Chandler: I couldn't answer that, Doctor. I don't know. I will say this: that if there is uneven drying present in a skein and that skein is put through textile operations, due to the peculiar physical properties of the yarn, such as its high wet elongation, you are going to have a variation of physical properties that will undoubtedly show up in the dyed yarn later.

Dr. Harold: Would there be any advantage, then, in so treating your yarn that its dehydration was never complete, for example, by adding a touch of glycerin, so that you never got down to your lower limit, and thus promoted evenness, by reducing the differential of dead dry and moderately moist?

Mr. Chandler: Possibly there might be. It is an interesting point.

Dr. Harold: The reason I ask is that in frequent extractions of Acele yarns for finishing agents, I find that if I should use, offhand and at once, a solvent for the acetate I can get the acetate completely out. If, however, I change the order of my extractives and use water first in getting out some things that I think are soluble in water, and delay my solubilizing of the acetate itself, I find frequently by my water treatments that I have completely altered the solubility of the residual acetate.

Mr. Chandler: How hot is your water bath?

Dr. Harold: The heat of the extractive, which is very uneven, is perhaps 80°C.

Mr. Chandler: Do you think that the yarn could come in contact with any unequally heated portions of the Soxhlet?

Dr. Harold: Essentially, a Soxhlet extractor is a very uneven vessel. That which contacts the outside of the Soxhlet extractor, near where the steam rises is very likely around 95°C. There are some portions of the Soxhlet extractor which are constantly below 60° C., I should say.

Mr. Chandler: Have you ever dyed Acele samples in a beaker or enamel pot, stirred them up, had the temperature fairly hot, had them come in contact with the side of the pot, and then when you got through found a milky spot present?

Dr. Harold: I hadn't noticed it.

Mr. Chandler: That is true and what you say leads me to expect that something like that might occur in your Soxhlet It is the uneven heating of your Soxhlet in contact with the yarn at those points that has given the trouble because if you will take a piece of cloth and dye it up in a beaker under an open flame, and rub that cloth in contact with the side of the beaker, invariably you will make a milky spot in the fabric, even though the temperature of the water is only moderately hot.

Mr. J. A. Clark: In finishing some all-Rayon fabrics, occasionally a sort of stovepipe luster is acquired. How can you eliminate that?

Mr. Chandler: Speaking of all-Rayon fabrics?

Mr. Clark: No, all-Acele.

Mr. Chandler: Usually that stovepipe luster comes from running it over a palmer that is too hot, running it over a finishing roll somewhere too hot, drying it out too dry under too much heat and tension. Wherever possible my idea—remember, I am not a dyer; these are my own ideas and you can take them for what they are worth—is that Acele fabrics should be extracted on a shell extractor at full width or over a suction machine and then slack dried. After slack drying, run over a tenter frame with a little steam. If you want to run them over a palmer later on, it can be just slightly warm. It should not be hot. That seems to leave the moisture in the goods. It seems to bring them up so that they are full and supple, and it avoids that stovepipe shine.

I thought possibly I might have a satin here that showed a stovepipe finish, but I haven't.

Mr. Freedman: What is a safe ironing temperature for Acele fabrics, dry and also wet, or damp?

Mr. Chandler: Do you mean, when you speak of ironing temperature, the temperature of the coils in the iron or the temperature—

Mr. Freedman: I mean the surface temperature at the base of the iron That, by the way, ranges from 140° Fahrenheit up to about 325 on the electric irons or they may go a little higher.

Mr. Chandler: The safe ironing point depends somewhat on the weight of the iron and the speed with which it is operated of course, but for dry ironing in an ordinary way, the safe ironing temperature is somewhere around 165° to 185° centigrade, or rather that is the highest temperature that it will stand. Of course, if you leave the fabric in contact with the iron at these temperatures, it is going to fuse. But when I speak of ironing I mean pushing an iron across a fabric and not trying to take the fusing point of the yarn by leaving it in contact.

When you wet the fabric it changes somewhat, but not a whole lot. It is right in that range. In other words, on an Edison Hot-Point Automatic, four-pound iron, the low setting on the iron is perfectly satisfactory at all degrees of either dryness or dampness. If you go to the middle setting, the temperature is dangerous. The high setting will ruin the cloth almost immediatety.

Mr. Freedman: Well, I believe the middle setting of the iron approximates the high point or reaches about the highest point, somewhere around 250 degrees Fah-

renheit. Your 175° centigrade I should judge is around 347° Fahrenheit. I don't believe that any of the acetate yarns will withstand that temperature unless you brush your iron over, or take your iron over very, very rapidly, and even then in the wet state or slightly damp, I doubt that the acetate yarns will withstand that.

Mr. Chandler: That is probably true. I was remembering those figures from some that I had occasion to use just yesterday. We had a fabric that was ironed at 165° centigrade and 210° centigrade, both dry and damp. At 210° centigrade, it was appreciably affected. At 165°C it was not affected.

Mr. Freedman: How would that work on a seam or a pleat?

Mr. Chandler: That I couldn't say.

Mr. Freedman: That is where failures occur more frequently than on a smooth fabric.

Mr. Chandler: It has been some time since I had occasion to work with ironing temperatures and that is why I gave you the temperatures I did on that iron, because that is the iron we use. If you know the temperatures of that particular iron, which I know is quite accurate, the yarn at all degrees of dryness and dampness will stand the low setting of a four-pound automatic iron.

Mr. Freedman: Is there any difference in resistance to heat when damp as compared to dry acetate yarns?

Mr. Chandler: Not in the ordinary ironing range. When you commence to go up and use a hot iron so that you will develop appreciable amounts of steam in the goods, then there is a real difference.

Mr. Freedman: The damp yarn requires a lower temperature?

Mr. Chandler: Yes. Does that check with your findings?

Mr. Freedman: Yes.

Mr. Chandler: That is, the acetate fabrics should not be ironed too damp.

I might ask Mr. Freedman, since he has fired this question at me, what he finds for the most ideal ironing conditions for acetate fabrics.

Mr. Freedman: Ironing rapidly with the electric iron set at low rather than medium or high is safest.

Mr. Chandler: How about dampening the fabrics? Should they be dry, damp, or fairly wet?

Mr. Freedman: I prefer dry ironing. I believe that is most efficient. Where it isn't dry, I believe slightly damp is better than ironing when wet. I don't agree with some on the use of a double thickness of damp cloth over an acetate yarn in the ironing.

Mr. Chandler: That checks in general with what we have found: that you iron rapidly with a medium iron on a dry fabric and then, if you have difficult wrinkles, they can be sponged lightly. That seems to be the safest and surest way. And then if your wives are doing the work, have them iron the fabric on the wrong side.

Mr. Freedman: That is a very important admonition.

Chairman Herrmann: If there are any more questions we would like to have them. If not, we will give Mr. Chandler a well-earned rest.

If there is nothing else to come before the Section, the hour is almost ten, and I should like to call for a rising vote of thanks not only for the two speakers but I should like to include our Program Committee that provided this very entertaining evening.

. . . The motion was carried and the members arose . . . (Applause)

. . . The meeting thereupon adjourned at nine-fifty o'clock. . . .

MEETING, N. C. STATE COLLEGE STUDENT SECTION

The North Carolina State College Student Section of the American Association of Textile Chemists and Colorists recently held its first meeting of the season and had as the principal speaker, Mr. W. A. Pardue of the Burkart-Schier Chemical Company, Chattanooga, Tenn. Mr. Pardue discussed the processes of "Mercerization" and "The Manufacture of Sulphur Dyes."

APPLICANTS FOR MEMBERSHIP

Active

Robert E. Pennell, Chemist, Textile Chemical Co., Anderson, S. C. Sponsors: Alfred R. Macormac and Charles B. Ordway.

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Osborne C. Bacon, Chemist, Central Laboratory, U. S. Finishing Co., Providence, R. I. Sponsors: Wm. H. Cady and Raymond A. Pingree.

Fall Meeting, Southeastern Section

(Continued from page (289) 639)

W. C. Jackson—Lowell Bleachery South, Griffin, Georgia, as Vice-Chairman.

The winter meeting will be held at LaGrange, Georgia, some time during February.

A rising vote of thanks was given Professor C. A. Jones, of Georgia Tech, and the reception committee for an enjoyable evening and meeting.

Respectfully submitted,

CHARLES B. ORDWAY,
Secretary

Proceedings of the American Association of Textile Chemists and Colorists

Rayon Knitting, Dyeing and Finishing*

By CARL EPPS
Tubize-Chatillon Corporation, Rome, Ga.

RAYON owes its present important position in the textile industry to the untiring efforts and co-operation of producers and manufacturers of textiles.

The rayon producers' interest in the successful care and handling of rayon and rayon fabrics is maintained throughout all their processes and those of their customers, including the service and satisfaction of same to the consumer. This interest has had the full support of textile manufacturers using rayon and their cooperation with producers has created a market of importance which has been the life of many concerns.

Textile manufacturers or consumers of rayon yarns are hungry for suggestions tending to improve their handling methods and turn out a better product with a higher grading.

The result of this cooperation has resulted in the solution of most of the major problems of rayon users through research, development and improvement in yarns and processing.

The solution of major problems being a necessity, it automatically demands direct contacts with the yarn consumers' processors and the producers' agents. Beyond these major problems there are numerous minor problems which require a better understanding between yarn producers and many consumers.

These minor handling problems involve more or less detailed attention than the difficulties seem to the yarn consumer to warrant, however, if the employees of users processing yarns could have a better understanding of the strict care required by producers throughout all their processes there would be much less reworking, greatly improved production records and a better finished product.

The textile chemist and dyer is in a position to understand the importance of attention to minor detail and how quickly a little oversight on his part will make a lot of goods unusable and the mere mention of tolerations permitted in manufacturing rayon readily makes its impression of importance on him.

In producing rayon, strict chemical, time, temperature and humidity control are necessary. Raw materials, chemicals, water and everything are analyzed and tested and condemned if not within the required limits; spinnerettes, pressures, speeds, temperatures and humidity must be uniform at all times, 24 hours a day and seven days a week. Where viscose production temperatures do not exceed 180° F. and humidity in finishing is maintained at 65% at a temperature of 70° to 76° F. you can appreciate what nearer approaches to these conditions would do in yarn users' plants.

Workers handle the yarn with hands on the bobbin, spools and cones instead of the yarn except in skein processing and very few exceptions to avoid damage to the fine, delicate filaments. A few broken filaments, an extra knot or two, a loose end, a stain, a bruise and many grading requirements observable only to the experienced operator or inspector condemns the yarn as off-grade or substandard.

Yarn count, that is, denier, per cent of moisture and per cent of oil must be correct or out goes the lot to substandard.

Every package of yarn is handled with care individually or on carriers and never handled with any rough treatment in any way, including loading out for shipment.

Now contrast these conditions with the unloading of the rayon in cases at the yarn consumer's plant throughout all processes to the finished product and what causes many of the invisible difficulties of the rayon consumers' processors is self-evident

The colorist or chemist of a textile plant is in a position to be of invaluable service to his organization. All work passes through his department and he is in position to judge whether it has received proper handling up to his department by giving this feature a little consideration and with a little initiative he is also in position to tell if the subsequent finishing could be improved upon.

This envious position also strikes me as being the place around which to build up an excellent department of mill standards for materials and supplies including experimental, research and general supervision opportunities. In other words, a center of control for plant operation, and if I were starting out as an apprentice today I would want no better opportunity than a job in a dye house or colorist's or chemist's department.

Scouring and Dyeing Rayon

For those interested in a more specific discussion on rayon handling in the dye house, we are again reminded of the fact that major difficulties command and get attention to the point of being passable at least, but the minor detail is the hard customer.

Whether your grey stock bins, chemicals, dye storage,

* Presented at Meeting of S. E. Section, Oct. 15, 1932.

color matching and testing equipment, dyeing equipment and other conditions are suitable, satisfactory and well arranged or not, we have to accept same as they are and work for improvement.

Keeping everything clean and in good order makes a fellow feel more like working and inspires a pride in the work turned out, in fact, this is a requisite for satisfactory results.

If the grey goods reach the grey goods bins in good, clean condition, free from unnecessary grease, dirt and waste, etc., picked up in grey goods manufacturing one can hardly ask more. Are the grey goods storage bins in such condition that damage in any way does not occur there? You know the least rough place will damage rayon. Walking over goods whether in bags or not does not help rayon. Rough handling in and out of bins or while preparing for dyeing takes its toll. Are the dye bags in good condition and never overloaded? Are your dye machines always clean, smooth and free from roughness of all kinds? Does grease get into your dye bath through the dye machine bearings or boxes? Are your steam and water pipes free from rust, scale and obstructions? Do you standardize on dyes, chemicals and supplies, or use a different kind from time to time and expect uniform results? Preheated water is a wonderful help in dyeing. Could your assistants be a little more careful here, there and elsewhere and improve even slightly on the work coming out of your department? These are a few thoughts to check up on from time to time.

Difficulties will arise as long as dyeing is done and each problem is different and has to stand on its own feet. To solve these problems calmness and systematic approach is necessary.

Variations in color in the same rayon hose or other fabric might come from a very seldom irregularity in yarn. This irregularity could be in the yarn to start with or result from dampness or drying out or other conditioning change or occur through the stresses and strains of tensions and stitch formation in knitting or otherwise. Such variations are greater with some dyes than others and very often a few tests will permit selecting a dye that gives acceptable results. Your rayon supplier, and dye and chemicals concerns are glad to cooperate in the solution of such problems if furnished with samples, a list of dyes and dyeing process and conditions. Uneven stretching of rayon through irregular running tensions or otherwise causes the stretched portion to have a different affinity for dye as compared with the unstretched portion. Uneven temperatures and circulation of dye bath, as you know, cause different shades in the same lot. Improperly scoured goods will not give the best dyeing results.

Numerous scours are satisfactory, but the basis for scouring ingredients consists of:

1. A good soap
2. An emulsifying agent.
3. A solvent.
4. A mild detergent.

Scouring oils containing these ingredients are available and used extensively. Some dyers prefer scours of their own mixing, using one or more of these agents as the case merits. But whichever method is being used, and scouring difficulties arise, the problem may be approached on a laboratory scale by taking a unit—say 100 grams, or any other unit of goods, to scour with the proper amount of water and under as near the practical volume conditions as possible make a few tests to find a satisfactory scour.

With a 20 to 1 bath and 100 grams of rayon goods, assuming the rayon contains 6% oil which is 6 grams, it will be necessary to use sufficient scouring agents to emulsify this 6% oil and keep same in emulsion without injurious precipitations until this bath is drained. Your experience and observations will tell you how to make the changes which are necessary. The other point presenting itself here is that a few of these simple tests may reveal that the scours you are now using are either inefficient, insufficient or excessive and a change in the ingredients, their per cent, or to some other scour will be economy.

It is needless to point out that viscose yarns of different manufacture are best kept separate owing to a slight difference in their affinity for dye. Even when a rayon producer changes processes which affect the dye affinity, proper notice follows:

Different lusters such as bright, semi-dull and dull of the same manufacture show differences of shade from a different reflection of light.

Nitro cellulose dyes slightly different shades from viscose in the same bath.

Acetate has its own group of dyes, though stained by certain other groups.

Cuprammonium silk has its own individual dyeing characteristics.

These are mentioned for attention in not mixing in the same dye bath, the results of which are familiar to the dyers, but sometimes disregarded in the knitting or grey goods room.

From dyeing through finishing the dyer or colorist and chemist can and may be of material help to the finishing room man, and acquaintance with his problems and full cooperation will make the connection between the two departments profitable to each and their concern also.

Rayon producers have long since, in case of trouble, always looked for it *in their own plants.*

The education of the technicians in rayon manufacture for years has been—"do not blame the raw materials." Of course, the incoming raw materials are submitted to exacting tests.

In case of trouble first blame yourself—it is too easy just to blame the other fellow.

Proceedings of the American Association of Textile Chemists and Colorists

The Latest Research Work on Cotton Bleaching*

By **PROF. DR. HUGO KAUFFMANN**
Director, Chemical Dept., Reutlinger Textile School, Germany

THE oxidizing agents used for bleaching cotton are mainly hypochlorites and peroxides. Other agents need hardly be taken into consideration. Ozone, for instance, representing highly active oxygen, has been found unsuitable by our investigations because it is not stable enough, too expensive and attacks the fiber. In grass bleaching, used in former years, the active agent was sunlight, the blue and violet rays of which destroy the natural fiber dyes by photolysis and bleach them. This process takes place slowly, however, and has the further disadvantage in that the ultra-violet rays, which are present at the same time, endanger the textile fabrics, as they may attack and completely destroy the fiber. Contrary to many assertions, ultra-violet light is not a useful bleaching agent.

The tendency of injury to the fiber must be taken into consideration when using all bleaching agents. However, there is a possibility of controlling and decreasing this injuring tendency and, by so doing, avoiding any damage to the fiber. In order to clarify some of the theories of bleaching dangers, I have for many years, with a number of co-workers, conducted investigations regarding the course and the kinetics of the fiber attack. First of all, we had to find a suitable testing method for the fiber injury. The determination of the copper number proved to be too complicated and, therefore, we developed the following method, giving quicker results, which has found its way into practical use. A weighed quantity of the bleached cotton to be tested is boiled-off with a three per cent caustic soda solution and the dissolved organic substance is titrated with permanganate. The c.c. of tenth normal permanganate per gram of cotton, I have called the Boil-Off Number. It is below ten if the material is uninjured and rises to 100 or more if the material is badly damaged.

This method, like the copper number method, is based on the fact that the damaging bleaching agent has produced oxycellulose—that is, it has attacked, by oxidation, some of the fiber molecules. If, during the process of bleaching, the oxycellulose is washed off by an alkaline bath, then neither the copper number nor the boil-off number gives a clear picture of the situation. In such cases, our problem is more complicated and therefore we also use, along with the tensile strength tests, the method perfected by Clibbons and his co-workers at the Shirley Institute in Manchester, England, according to which we determine the viscosity of the cuprammonium solution of the material being tested.

For our experiments, we used cotton fabrics manufactured in our own institution and very carefully bleached. The boil-off number of our goods was about two. Even after repeated alkaline boil-offs, this value was not diminished and we therefore call it our "base value." This base value is caused partly by methodical errors, partly by the fact that, even in material of the highest quality, boiled with the exclusion of air as, for instance, in a hydrogen atmosphere, traces of fibrous substance dissolve in boiling caustic solutions. Special experiments have shown that these traces are less than one per thousand.

We have very carefully investigated the chlorine bleach and thoroughly studied the reaction of hypochlorites, especially of bleach liquor on our standard goods. We confirmed the claim that the tendency to fiber attack decreases as the alkaline content of the hypochlorite solution increases. We thought, at first, that we could explain this result in the usual way by means of the presence or absence of hypochlorous acid, which is formed according to the equation

$$NaOCl + H_2O \rightleftarrows NaOH + HOCl$$

or

$$OCl^- + H_2O \rightleftarrows OH^- + HOCl$$

which, therefore, is present in each bleaching solution and which would be the substance responsible for the fiber damage. The state of equilibrium of the above equation is changed by the increase of alkali, that is, by a rise in the pH. This reduces the amount of the free hypochlorous acid and would indicate why the more alkaline solutions become less dangerous.

Further experiments conducted with non-alkaline solutions, however, showed that this explanation cannot be correct. We worked with hypochlorous acid, causing it to react on cotton under various conditions and found that it attacks the fiber only very slightly. This indicated that

*Presented at meeting of Philadelphia Section, Sept. 30, 1932.

all previous assumptions regarding the action of hypochlorite bleaching liquors contained an error and we resumed the study of these liquors from an entirely new point of view.

We investigated the action of chlorine bleaching solutions on dyestuffs and measured the time required for the color of the dyestuffs to be completely removed by the bleaching solutions under definite conditions. Only a few dyestuffs were useful for this purpose, one of which, Beta Naphthol Orange is especially satisfactory. This is an easily soluble azo dye which I will employ in the following experiments.

The fundamental idea arising from these experiments is that two substances are necessary for the bleaching effect, one of which is a true oxidizing agent and the second of which I call an Activator. In a chlorine bleaching liquor, the oxidizing substance is the hypochlorite ion and the Activator the hypochlorous acid. In one of these beakers, I have an ordinary diluted hypochlorite solution. In the second beaker, I have the same solution, to which has been added some caustic soda. To each beaker I add an equal amount of the Beta Naphthol Orange solution. In the first beaker the color disappears almost immediately. In the second beaker, the color disappears rather slowly and is not entirely gone for approximately half an hour. The reason for this is that the second beaker contains hardly any hypochlorous acid—that is, hardly any Activator. In a third beaker, I have the same solution as was in the second beaker. To this I add a different Activator and the decoloration takes place almost immediately. In this case, the Activator is diluted hydrogen peroxide, which is a very excellent Activator for hypochlorite solution. In a fourth beaker, containing the same solution as the second and third, I show you that ammonia works in the same way as hydrogen peroxide. However, this requires a certain induction time because the true Activator in this case is not ammonia but chloramine which has to be formed first. Acid amides and amino acids are also Activators of hypochlorite solutions. As an example, I might mention urea, which first changes to dichlor urea. This dichlor urea then activates the hypochlorite solution for some time. If the Activator is used up, the bleaching solution becomes almost inert.

That substances of entirely different composition can act as Activators is proved by the case of dimethyl glyoxime, which is of an entirely different nature, but, in spite of this fact, effects decoloration just as promptly.

I am sorry that the time is lacking to explain this matter of activation more thoroughly but I can say that we have successfully used as an explanation the Haber-Willstaetter theory of the chain of reaction.

If a bleaching solution, be it sodium hypochlorite or chloride of lime, is prepared, only on the basis of its active chlorine content, its suitability for bleaching is still not accurately determined, as only the presence of an Activator produces the bleaching effect. Usually this Activator is the free hypochlorous acid. A good hypochlorite bleaching liquid contains about one milligram of hypochlorous acid per liter. Such a bleaching solution allows the bleaching process to take place without attacking the fiber to any considerable extent. If the chlorine bleaching solution contains a higher amount of Activator, it becomes dangerous to the fiber and if Activator and hypochlorite are present in the same equivalent amount, the fabric to be bleached will be very seriously injured or possibly destroyed. Even in the presence of very little active chlorine a condition like this is very dangerous to the fiber. If an excess of Activator is present, the destroying tendency is diminished and in a solution of Activator alone, the fiber is practically not affected at all. From theoretical calculations, the maximum activation of chlorine bleach solution takes place in the pH range of 7.0 to 8.0, that is, when the bleach bath is close to neutral on the alkaline side. There are no essential differences between liquid bleach solution and chloride of lime solution. Both react in the same way except that in practice the chloride of lime solution sometimes is less alkaline and contains more hypochlorous acid; that is, more Activator and, for this reason, is more active.

There are also other Activators of chlorine bleaching solution which may endanger the fiber. The addition of ammonia to a chlorine bleach solution causes the formation of monochloramine, which is an Activator and which may, in some cases, cause an attack on the fiber.

The degree of damage which may be caused by chlorine bleach liquid depends not only on the activity but also on the diffusion. In highly active baths, every mechanical action which increases the circulation of the liquid through the fiber increases the tendency to damage. However, it is entirely different with weak alkaline bleach liquors, such as are usually applied in practical work. If a cotton fabric is soaked with bleach liquor and then squeezed between rollers, as is done in bleaching piece goods, it enters the zone of danger. Ordinarily it is claimed that cloth steeped in chemic is tendered by the action of carbon dioxide of the air. This is not at all correct. It is the insufficient diffusion which locally reduces the pH by the formation of acid oxidation products, which causes the danger of damage. At retarded diffusion, the liquid saturating the textile fabric turns graduall neutral of itself on standing and if all the active chlorine has not all been used up it enters the point of highest activity.

We have conducted experiments with peroxide similar to those carried out with chlorine bleach liquids and we have found many analogies. Hydrogen peroxide may be compared to hypochlorous acid in its action. Both are useful for bleaching in alkaline solutions and the mechan-

ism of the reaction is probably analogous. However, hydrogen peroxide has a considerably lower oxidizing power and, therefore, is less dangerous to use.

The oxidizing substance in a peroxide bleaching solution is a salt of hydrogen peroxide and the Activator is the free hydrogen peroxide itself. The exact investigation of hydrogen peroxide bleaching solutions is rendered difficult by catalytic influences which are much more pronounced in peroxide bleaching solutions, than in the chlorine bleaching solutions. These catalytic influences are either of the peroxydate type, which causes damage to the fiber; or the catalase, which effects only the decomposition of the peroxide without attacking the fiber. For instance, iron in the ferrous state acts as peroxydase; metallic platinum as catalase.

Our investigations of which I have given you only a short outline have produced entirely new points of view leading to a clearer understanding of the bleaching reaction. We trust that they will make it possible to control the technique of bleaching to a much higher degree than is being done today and, therefore, to allow us to overcome more easily the difficulties of practical work.

ANNUAL MEETING
.. NEWS ..

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¶ See page following for notice regarding the Annual Meeting.

¶ Watch for the November 21st issue for complete information.

Notice to all Association Members...

The Annual Meeting of the American Association of Textile Chemists & Colorists will be held on

December 2nd and 3rd, Friday and Saturday, at the

King Cotton Hotel, located in

Greensboro, North Carolina. In the November 21st issue of the American Dyestuff Reporter will appear a

Complete Program of all events scheduled for this important gathering.

Plan to attend! ! !

AMERICAN DYESTUFF REPORTER

Devoted to the Interests of Textile Chemistry, Bleaching, Dyeing, Finishing and Printing.

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Volume XXI November 7, 1932 No. 23

SILK AND RAYON RESEARCH BUREAU

THE establishment of a silk and rayon research bureau was recently announced by the Silk Association of America. The object of this bureau, as defined by the Association is to undertake an extensive survey of conditions in the silk and rayon industries and to carry on, in collaboration with the Textile Foundation, certain special studies in the field of marketing. Already a study of the equipment available in the industry has been started.

According to Ramsay Peugnet, director of the newly organized bureau, there is a need for going even further into the causes behind existing conditions although many plans have been carried out to afford temporary relief to the industry in its peculiar problems. He further states that many of the former suggestions made for improvement of conditions have failed to accomplish all that was expected of them because a full knowledge of the roots of the evil has been lacking. It is such knowledge of the fundamental causes of the textile industry's problems that the new bureau will endeavor to place before the trade, together with recommendations for improvement.

Authorities on merchandising problems have been retained by the bureau to assist in the interpretation of the information collected, and to act in an advisory capacity. The marketing studies, toward which the Textile Foundation has contributed a special fund, are expected to form a most important part of the research activities.

As is necessary, the cooperation of the entire trade is requested in order to obtain the maximum benefit from this new bureau. We are heartily in accord with any research instigated to help the textile industry but according to a recent story in the *Daily News Record* everything in this particular case is not quite agreeable to those concerned. We understand that considerable annoyance was expressed by quite a few rayon yarn executives upon the announcement of the bureau. It seems that the rayon factors were especially concerned in that reference was made to rayon, inasmuch as there was a possibility that funds that would have been used for rayon research would be diverted to silk. The initial investigation, as announced by the new bureau, is of little interest to rayon firms and they feel that there are other more important subjects that should have first study. Quoting the story we read:

"Quite a few in the rayon trade stated that, while the Silk Association had supposedly represented the rayon industry, it had done but little that had been of service to the rayon industry. Considering the membership in the Silk Association of rayon yarn makers, the rayon industry has gotten little out of it, they declared.

"In this particular case, they feel that the inclusion of the word 'rayon' in the title of the research group tends to confuse not only the Textile Foundation but also others who might think that some real research work might be done for the rayon industry."

If such a condition is true it is doubtful whether the rayon trade will get any benefit from the new bureau. Although there is a close similarity between the marketing of silk and rayon the dissatisfaction expressed by the rayon men shows that what one industry needs in the matter of research is unimportant to the other group. It would seem that the only solution to this condition which is said to exist would be the formation of a separate bureau to conduct research for the rayon industry, or if this is not suitable, the formation of a separate rayon association.

A. I. C. Meeting

In line with the policy established last season to bring before the public the value of chemists' services to various branches of business and industry, the meeting of the New York Chapter of the American Institute of Chemists, to be held at the Chemists' Club at 8 P. M. on Friday, November 11th, will be addressed by Dr. Colin G. Fink on the "Electro-chemist in Art and Archeology."

Dr. Fink, son of the founder of Lehn and Fink, manufacturing chemists, is well known as the inventor of the tungsten filament electric lamp and other devices utilized in lamps, radio tubes, etc. Since 1922 he has been head of the division of Electro-chemistry at Columbia University, and has devoted much of his time to research on electroplating with chormium and tungsten and the corrosion of metals and alloys of metals.

A Seller's Prayer

O Lord, deliver me from Buyers who know the price of everything and the value of nothing; who believe that they can get a dollar's worth of value for fifty cents; who think that cheapness is thrift; who judge values solely by appearances; who ignore the economy of quality; who are penny wise and pound foolish; who believe they are getting something for nothing when they pay less; who buy things just because they are cheap and whose God is price.

Give me, O Lord, Customers who know that the recollection of quality remains long after the price is forgotten; who realize the extravagance of paying too little; who can see the bait in a bargain price; who know that cheapness destroys confidence; who recognize that profitless prices benefit no one; who know the difference between a bargain and a cheap price; who know the high cost of the low price; who realize the risk of accepting the lowest quotation; who recognize that somebody is always willing to make things a little worse and sell them a little cheaper.

Above all, O Lord, teach Buyers to know that price is only a minor factor in every transaction and that honest quality and genuine character still command a premium; that a dependable source of supply is worth more than a cheap price; that courtesy, co-operation and helpfulness are rarely included in bargain offers and that the honor and integrity of the seller is the Buyer's greatest assurance of full value.—*The Canfield Counselor, Aug.*, 1931.

German Coal-Tar Dye Exports Decline; Imports Increase

German exports of coal-tar dyes during the first half of 1932 showed a sharp decrease from 1931 figures, accompanied by a large increase in the relatively small imports. As in other years, Asia continued to absorb more than 50 per cent of the imports, accounting for 78,652 metric quintals in the first half of 1932, while 57,835 quintals went to European countries. Switzerland supplied most of the aniline dyes imported while Italy and France supplied the greatly increased indigo imports.

Meeting of S.O.C.M.A.

The regular monthly and general meeting of the Synthetic Organic Chemical Manufacturers Association was held at the Chemists' Club, New York City, on Thursday, October 20, 1932, President Merz presiding.

The President turned the meeting over to Dr. E. H. Killheffer, Chairman of the Association's Tariff Committee, and there ensued a general tariff discussion until adjournment. The meeting adjourned at 3:20 P. M.

Butterworth Changes

H. W. Butterworth & Sons Co. have just announced with regret the resignation of Mr. Arthur C. Freeman, Sr., vice-president and member of the board of directors of the company.

It is with similar regret that they announced the resignation of Mr. Arthur C. Freeman, Jr., son of the vice-president.

For many years Mr. Freeman and his son, together with Mr. Thomas W. France, have been identified with the New England office of H. W. Butterworth & Sons Co., located at Providence, R. I. This office will now be under the direction of Mr. France, with Mr. J. Ebert Butterworth, and Mr. DeHaven Butterworth making frequent trips into the territory from the home office in Philadelphia.

New Direct Violet

The General Dyestuff Corporation releases Fastusol Red Violet RL, a homogeneous product, supplementing their Fastusol range.

The fastness to light of this new color is claimed to be unrivaled among the direct dyestuffs so far on the market. It is said to be valued as very good to excellent (7-8). The color is also recommended by the manufacturer for dyeing rayon level and for dyeing cotton-rayon the same shade.

Correction

On page 634, October 24th issue, the titles of the first and fifth dyes appearing in the article captioned "Sandoz Dyes" should read "Pyrazol Fast Orange 2 RN" and Fast Silk Sky Blue 6 G" respectively.

Six Months

	Exports				Imports			
	1931		1932		1931		1932	
	M. Quintals	1,000 marks	M. Quintals	1,000 marks	M. Quintals	1,000 marks	M. Quintals	1,000 marks
Aniline, sulphur and other coal-tar dyes n.e.s.	165,660	69,597	121,125	56,237	13,233	7,000	16,508	8,876
Alizarin	10,271	5,871	12,270	5,790	188	136	92	123
Indigo, natural & synthetic	57,326	11,343	17,832	5,313	77	22	2,828	272
Total	233,257	86,811	151,227	67,340	13,498	7,158	19,428	9,271

Color as a Transformer of Energy

(Continued from page 638)

become apparent and it is easy to obtain impure and very dark shades; but, as the inclination of the left side falls, the red increases, or rather seems to increase by contrast.

While the curves of all dyestuffs have a general V-shaped trend, it is seldom that both sides of the wedge are rectilinear; irregularities are numerous, particularly for mixtures of dyes. Superposition of two absorptions can give rise to W-shaped curves, the two lower points of which are usually at different heights, while the ordinate of the middle point is always necessarily less than 100. Such is the case with greens obtained by mixing yellow and blue.

With certain colors two distinct and separate absorption wedges are obtained. For instance, barium sulphate gives a wedge in the ultra-violet between 250 and 350 mμ and another one in the infra-red between 800 and 900 mμ. Of course these absorption wedges do not affect the apparent color in the visible portion of the spectrum; but it is peculiar to note that the color which is generally used as a standard white on account of its apparent high purity presents such dangerous pitfalls right on the borderline of the region where the measurements are made.

Finally, the general trend of color curves enables us to foresee that the production of monochromatic dyes (transmitting only a narrow band of visible rays), which is impatiently awaited by the dyeing industry, is highly problematical; but, on the other hand, the production of dyes which will absorb only a narrow band, which we have called "antis" (anti-blue, anti-yellow, etc.) and which are indispensable for neutralizing excess of dyes in the final adjustment of shades, should be easy to accomplish.

As each color wedge represents an absorption of energy, what becomes of this absorbed energy? It is given up in the form of heat and of fluorescence, and this justifies us in saying that color is merely a transformer of energy. It is known that fluorescence is the property whereby a dye can transform, by transmission, part of the incident rays, of average wave-length λ into light of a different wave-length λ'. If, in the band of the spectrum bounded by the base of the wedge, we denote by E the energy emitted by the source of light and received by the object, by e the energy transmitted by the object as normal lightly, by e^e the energy accumulated or transformed into heat, and by E' the energy transmitted in the form of fluorescent light, we have:

$$E = e + e^e + E'$$

E can be considered as constant; hence, for a given value of e, that is, for a given absorption wedge.

$$e^e + E' = Cte$$

Thus, fluorescence takes place only at the expense of the heat absorbed and not of the light transmitted normally.

In the case of two dyes having different compositions but practically the same color curve, if one is more fluorescent than the other, it absorbs less heat from the source of light. The difference is evidently extremely small; for dianil yellow, which is very fluorescent, and Sirius yellow we found it to be less than 0.1°C at a temperature of 20°C.

As the energy required for fluorescence originates in the absorption wedge, we tried to measure it by means of the photo-electric cell.[2] The numerous experiments which we have just recently completed revealed the following general properties:

All dyestuffs, without exception, are fluorescent, but the intensity of fluorescence E' varies within wide limits.

The average wave-length λ of the exciting rays always corresponds to the maximum of absorption, that is, to the apex of the absorption wedge.

The wave-length λ' of the fluorescent light is always about 100 mμ greater than λ.

The intensity of fluorescence E' increases as the angle of the absorption wedge decreases, *i. e.*, with the purity of the color. For a given dye E' passing through a maximum for a mean tone (concentration) which we have called the "critical" tone it is about 35% that of standard white barium sulphate, which corresponds to maximum purity. On the other hand, E' is always very small for greys and, *a fortiori*, for blacks.

Since $\lambda' - \lambda = 10$ mμ, and since λ is at the apex of the absorption wedge:

For the reds λ is in the green portion of the spectrum and λ' in the reddish orange;

For the oranges λ is in the blue and λ' in the orange yellow;

For the yellows λ is in the violet and λ' in the yellowish green;

For the greens λ is in the violet and λ' in the second infra-red;

For the blues λ is in the orange and λ' in the first infra-red;

For the violets λ is in the yellow and λ' in the red;

For the whites λ is in the ultra-violet and λ' is in the ultra-violet, the violet or the blue, or at most in the green, according to the position of the wedge, or else both λ and λ' are in the infra-red.

The difference of 100 mμ between λ' and λ increases the transmission in the direction of the longer wave-

[2] See *Comptes Rendus des Seances de l'Academie des Sciences*, Vol. 193, 933-934, Nov. 16, 1931; *Chem. Abs.*, 26, 920-921 (1932).

lengths and consequently makes the right side of the wedge steeper thus increasing the apparent purity of the color. It is for this reason that the strongly fluorescent yellows, and even oranges, change much less than the other when passing from daylight to artificial light which contains relatively little blue and violet.

Making due allowance for variations in the visibility factor as a function of wave-length, from the ultra-violet to the infra-red, with maximum in the yellowish green, the dyes having λ' in the yellowish green should theoretically appear most fluorescent to the eye. Experience confirms this, as it also confirms that homogeneous greens, blues which fluoresce into the infra-red and even violets which fluoresce into red are generally considered non-fluorescent. But this is merely an appearance, due to the bell-shaped curve of ocular sensitiveness; as a matter of fact all dyes of equal purity can be equally fluorescent.

Dyes having a double absorption wedge should possess double fluorescence; this actually is true of barium sulphate as well as of certain heterogeneous greens and most mixtures.

Conclusion

Color is merely a transformer of energy, of wave-length.

When a ray penetrates into the molecules at the surface of a body, part of its energy is transmitted without change in the wave-length while the remainder is changed to a greater or less extent. The change which takes place always increases the wave-length, as though the molecules, by a viscosity effect, tended to retard the rays. This produces heat, fluorescence and also phosphorescence, which is intimately related to the first two as it is really a retarded fluorescence.

The phenomenon evidently extends beyond the limits of the visible spectrum which constitutes but a small portion of the total transmission spectrum. And in order to predict its effects, it is essential to study color in the invisible spectrum, at least in those portions bordering on the visible spectrum, and it is here that color should be studied by means of the photo-electric cell in order to determine and understand its laws.

COLOR INTEGRITY IN PRIVATE BRANDING

(Continued from page 637)

facture on sample is much more common than manufacture to specification in the private brand field. And a considerable share of the own label output is supplied by private-branders-to-the-trade, who supply stock articles under whatever imprint a distributor-customer may prescribe. Under any and all of which circumstances, as may readily be surmised, the private brand marketer seldom has either the knowledge or the opportunity to compel an exact measure of color integrity.

Even more insidious, perhaps, for the cause of mass consumer confidence in color is the situation which is precipitated when the private brand owner yields to cupidity or price competition. It is indicated that in fair business weather a majority of private brand marketers enjoy on their own label items a gross profit or mark-up equal to or higher than that on the competing national brands. But this is not always so. For example, there is the smaller distributor who has succumbed to the lure of the private brand but whose operations are not large enough to command the most favorable quantity discounts. Facing the problem of a price differential, he is open to the temptation to meet the situation by concessions in quality. Then, too, human nature being what it is, the lust for pyramided profit at the expense of commodity quality may seize even the private brander who is already matching the margin of the national brander.

Interests that are solicitous for color integrity in privately-branded goods are hopeful that the advent, as a store adjunct, of the private testing laboratory may contribute to hold private brand suppliers to quality traditions. Eloquent also of the awakening of a sense of responsibility is the circumstance that legislation has been proposed in Congress which would compel the notation on every privately-labeled article of the name of the actual maker or producer, as well as the firm name or corporate title of the brand registrant. Even such steps will not, however, spell complete solution of the dyestuffs complex in "masked merchandise." The situation is pregnant of a realignment of responsibilities, should consumers show a disposition to ask who guarantees the color fastness of goods under untried private brands.

General Release

The General Dyestuff Corporation releases Celliton Red Violet RR Powder, a new dyestuff for acetate silk, applied from a soap bath.

The outstanding features of this product, besides its full reddish shade, are said to be its very good discharge and fastness to neutral cross-dyeing, which, it is claimed, are found for the first time in a direct dyeing acetate silk dyestuff.

Wetting-out Agents

Lenocal Liquid is a wetting-out, cleansing and stain removing agent for textiles of all kinds. Lenocal Liquid is claimed to be superior to Turkey Red Oils or products based on soap, in that it is stable to lime and acids.

Lenocal Liquid is said to be a very effective wetting-out agent in both cold and hot solutions, removes oil and grease stains, particularly where hard water only is available.

It is sold by the General Dyestuff Corporation.

Technical Notes from Foreign Sources

Dyeing of Loose Wool

Viktor Pollak — Deutscher Faerber-Ztg., 67, 306 (1931).—For lots of from 20 to 50 kg., loose wool is dyed in tubs or open vessels, so fitted up that the temperature can be brought at least nearly to the boil, a point of importance both for the dyeing and for possible after-treatment with chrome. The wool is worked about during the dyeing or chroming with poles.

In preparation for the dyeing, the wool must be scoured and carbonized. For the scouring, the perspirations, grease, etc., are removed simply by working the raw wool in tubs or crocks in a bath of 3-4% of soda, reckoned on the weight of the wool, or in a weaker soda bath to which has been added a little ammonia; the temperature should not exceed 50° C. The wool is worked in this bath for 20-30 minutes, and then rinsed with plenty of fresh, cold water, until the washings run off clear. After good draining, the wool thus scoured is carbonized, by impregnating it with dilute sulphuric acid of 3°-5° B., centrifuged, and carbonized as usual. The contained acid is then neutralized by treatment of the goods in a soda bath of 3°-5° B., the wool being then well rinsed and dyed.

When dyeing in open vessels, the usual amount of water is 30-40 times the weight of the wool. If any copper surfaces or fittings are exposed to the bath, the addition of ½% of ammonium thiocyanate to the bath prevents any trouble from the copper. When possible, dyeing in a modern, efficient loose wool-dyeing machine is desirable, as the flexibility and feel of the material is preserved, and there is little danger of the fiber felting together.

Metal-Containing Dyestuffs

German Patent No. 467,349 (4/X/'28).—*Gesells. f. Chem. Ind. in Basel.*—1—Hydroxynaphthalene-8-sulphamido-2-amino-4-sulphonic acid is diazotized, coupled to desired second components, and the mono-azo dyestuffs thus produced treated as usual with salts of copper or chromium, such as will introduce the metal into the dyestuff complex. The dyestuffs so formed are acid dyestuffs, and, if the second components used contain suitable groups, as the carboxyl group, they are also valuable for chrome-printing.

Three examples give full details of preparation of the intermediates and combinations, properties of the dyestuffs, their solutions in water, caustic, and concentrated sulphuric acid, the colors of dyeings upon wool, plain and after-coppered or after-chromed, etc.

The starting-point of the first component is 1-8-naphthosultone, which is sulphonated, nitrated, the sultone linkage split by amidation, and the nitro-group reduced, or else the sultone is sulphonated, the sultone group amidated, and this followed by nitration and reduction. The final product, of course, in the role of first component, makes the finished dyestuff one of the valuable ortho-hydroxy azo dyestuffs.

Pleating and Decatizing of Acetate Silk

Dr. N.—Deutscher Faerber-Ztg. 67, 306 (1932).—Fading or degradation of tone upon pleatings is usually to be ascribed to the dyestuff used, for many dyestuffs are not fast to the extreme conditions prevailing. Attention should be directed to this point in selecting the dyestuffs to be used; otherwise the goods will have to be redyed, quite possibly with a fast black, such as Cellitone Black B for acetate silk, or with Diamine Deep Black CR for viscose silk (i.e., if the goods were originally of another color, it may be necessary, in order to avoid their total loss, or to avoid bleaching, to redye to a deeper tone and repleat, to cover up the first faulty dyeing). Steaming after pleating, which is often assumed to be the cause of the injury to the color, can hardly be held responsible. Damage from such a source, upon acetate silk, would be easily recognized by an alteration in the luster, the damaged areas becoming dull. This is true, of course, in hot-pressing also. The steam should in any case never be led directly upon the goods, but should first pass through a layer of protective material, as, for example, the paper roll as used in a pleating machine. Care should be taken, also, that the steam be applied uniformly, the over-moistening of any part being avoided.

Decatizing or hot-pressing of acetate silk weaves is not meant to produce the same effect as is desired and attained in the case of some other fabrics, which are meant to gain a luster, to become less sensitive toward water (spotting), and to suffer no shrinkage upon being wetted. Acetate silk does not need to acquire this luster, nor do the other artificial fibers. Acetate silk runs little danger of showing water-spots, since it is rarely treated with a finishing agent soluble in or affected by water; such finishing agents (the non-aqueous ones) are not affected by decatizing. The third point mentioned above, that of shrinking, which some consider to take place in decatizing, does not occur to much extent in crepes, which are the form of weave in which acetate silk largely occurs—at least, it does not take place to the extent true of plain weaves. It should be remembered that such a trouble must unavoidably occur to a minimum extent only, with an acetate silk weave, because of the characteristic property of acetate silk, of not wetting readily. The portion of the weave which could shrink would be the woof, if this consisted of viscose silk or wool; shrinking of the woof simply involves the warp mechanically. If

this shrinkable component of the weave could be gotten into such a condition, by a strong twist on the yarn and a loose adjustment in the weaving, as is done with plain weaves, the difficulty might be largely overcome; but these methods have not been particularly successful. When goods which shrink, particularly crepes, are dried under tension, this is about all that can be done. Small pieces are best simply hung up to dry, and pressed dry.

Azo Dyestuffs

German Patent No. 466,961 (27/IX/'28.)—*Gesells. f. Chem. Ind. in Basel.*—The essential novelty of this patent consists in the use of trihalogen derivatives of cyanurotricarbonic acid. Such compounds are reacted with azo dyestuffs containing a reactive hydrogen atom, or else with compounds which contain such a hydrogen, and also such a group that it can be coupled to, after the above condensation, by a diazotized amine; or else a suitable compound containing an amino-group may itself be diazotized, after the above condensation, and coupled to a second component. A somewhat similar procedure has already been patented (British Patent No. 209,723), but the products in that case are not suitable for wool, whereas the present dyestuffs are most suitable for that fiber. By proper choice, however, of the components, dyestuffs can be produced which are suitable for use as direct cotton or mordant dyestuffs.

Five examples illustrate the red to orange dyestuffs. The range is capable of wide extension, by choice of suitable components.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF AMERICAN DYESTUFF REPORTER, published every other week at New York, N. Y., for October, 1932.
State of New York, County of New York, s.s.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the Publisher of the AMERICAN DYESTUFF REPORTER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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Managing Editor—Norman A. Johnson, 440 Fourth Ave., New York, N. Y.
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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is..... (This information is required from daily publications only.)

ALFRED P. HOWES, Publisher
Sworn to and subscribed before me this 13th day of October, 1932.
(SEAL) CAROLINE ESSENBREIS
(My commission expires March 30th, 1933.)

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